

Effect of algal anti-angiogenic polysaccharide on differentiation of stem cells

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Summary

Angiogenesis, forming new blood vessels, is involved in tumor growth and metastasis, atherosclerosis and diabetic retinopathy. Various anti-angiogenic substances including marine algal sulfated polysaccharides have been extensively studied. Recently it has been indicated that endothelial progenitor cells from bone marrow participate into forming vascular (vasculogenesis). Thus, it is important to examine whether the anti-angiogenic substances affect vasculogenesis in which endothelial progenitor cells participate. Although anti-angiogenic activity of sulfated galactan isolated from *Codium cylindricum* has been demonstrated, its effect on vasculogenesis from endothelial progenitor cells remained unclear. In this study, the effect of sulfated galactan on *in vitro* vasculogenesis was examined using mouse embryonic stem (ES) cells. As an *in vitro* vasculogenesis model, embryoid body (EB) model was used. EBs were formed by a hanging-drop method, and vascular-like structures developed in EBs. In the model, development of vascular-like structure was confirmed by PECAM-1 antibody (anti-CD31), and more than 80 % of EBs displayed the vascular-like structure. The effect of anti-angiogenic sulfated galactan was examined in the model. Consequently, inhibitory effect of the sulfated galactan on vasculogenesis was revealed. The sulfated galactan also suppressed development of microvessels from EBs cultured in collagen gel. These results show that anti-coagulant and anti-angiogenic sulfated galactan from *C. cylindricum* is a unique bioactive polysaccharide to prevent vasculogenesis from stem cells.